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ABSTRACT

This instructional packet is one of 14 school environmental education programs developed for use in the classroom and at the Dahlem Environmental Education Center (DEEC) of the Jackson Community College (Michigan). Provided in the packet are pre-trip activities, field trip activities, and post-trip activities which focus on animal populations and their habitats. Strategies for using these activities with third grade students are also provided. The pre-trip activities introduce three major topics: (1) habitats and communities; (2) Michigan communities; and (3) food chains and webs. Six activity sheets and a letter to parents explaining the purpose of the program are included. The post-trip activities are designed to help students identify and think about their values and to lead them to develop responsible attitudes toward the environment. Topics explored in these activities include wildlife management, endangered species, and the question of hunting. A list of formal and non-formal objectives for both indoor and outdoor field trip activities at the DEEC are presented in a separate field trip guide. Most of the activities are interdisciplinary and can enhance student skills in mathematics, reading, and spelling as well as in science. (JN)

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Animal Homes and Habitats

SE045117

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"Animal Homes and Habitats" is one of fourteen school environmental educational programs developed by the Dahlem Environmental Education Center of the Jackson Community College. Assistance for the project was provided by the Institute of Museum Services Special Projects Grant #G008103172, of the U. S. Department of Education.

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Animal Homes and Habitats

A Fall Activity Packet for Third Grade

Over the river and through the woods to an animal's house you go! You and your class are about to visit the homes of some of nature's prominent animal citizens.

Your "Better Homes Tour" will begin in the classroom with an introduction to concepts such as habitat, community, and food webs as they apply to animal and human worlds. A field trip to the Dahlem Environmental Education Center will enable you and your students to find and explore animal homes in a variety of wild communities. Back in the classroom, students will learn how the same environmental concepts they learned on the field trip also apply to home and school.

The concepts in "Animal Homes and Habitats" were selected after surveying third grade science curriculums across the country. Most of the activities are interdisciplinary and can enhance your entire school program.

"Animal Homes and Habitats" is designed to teach your students about the interdependence between humans and animals. This program will not only guide your students to an understanding of environmental concepts, but also assist them in identifying their feelings and opinions about environmental issues. Many activities are designed to give your students practice in observation, classification, and problem-solving skills. This winning combination will help build a promising future for our animal neighbors and ourselves.

So grab a jacket and hurry up -- this is your special invitation to drop in on some new animal friends.

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Goals and Objectives

Program Goal

Third graders will become more aware of animal populations and their habitats.

Program Objectives

Students will:

-discriminate between habitats and communities in the natural and built environments by comparing the characteristics of each.

-discriminate among the four major types of natural communities in Michigan by describing them.

-classify animals according to community by drawing food chains.

-demonstrate an understanding of food webs by comparing them to food chains.

-demonstrate a knowledge of population fluctuations by listing and explaining several natural causes.

-understand how humans alter animal populations by citing beneficial and detrimental examples.

-discriminate among a range of facts and opinions about hunting by first considering and then arranging them on a continuum.

-demonstrate cooperation and concern by selecting and participating in a wildlife-related group project.

Pre-Trip Activities

The pre-trip activities introduce three major topics that will enable your students to maximize their field trip experiences. Each section and activity is designed to introduce terms or concepts that will be expanded upon during your class field trip.

1. Habitats and Communities

Everybody needs a place to live. Your students know this but may never have realized that an animal needs a special place, too. This section helps students to identify what they need in a place to live. The similarity between human and animal needs is pointed out. By moving from the human-urban sphere to the animal-natural realm, it is hoped that students will gain an understanding of and respect for the needs of wildlife.

A Place to Live

People need a place to live. They live in houses. But a house does not have everything a person needs. Houses are arranged in neighborhoods which offer people what they need.

Student Handout 1 will help students describe where they live. The first part will help them to identify where they live. They should fill in the blanks with one or more descriptive words: "I live in a two-story, green house," for example. In the second part, stress that our neighborhoods are special to us. This helps students to clarify what they value or what makes their place to live special.

Identifying Wants and Needs

Student Handout 2 is designed to help students distinguish between wants and needs. Ask students to draw the things they think they need in a neighborhood on the "People Places" neighborhood map. If time permits, have students cut pictures from magazines to make collages representing what they need in a neighborhood.

Have students share their "People Places." Frequently baseball fields, sports cars, and ice cream stores are among

the perceived needs. Lead the students in distinguishing between the things on the drawing they really need and the things they would like to have but could live without. Make a list on the blackboard of the needs the class has finally identified.

2. Michigan Communities

Communities are identified by the types of plants living in them. Because animals depend on different plants for food and shelter, animals are generally associated with specific communities.

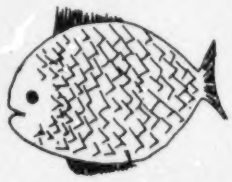
Four major types of communities are found in Michigan. WOODLANDS are areas with large trees and some ground plants. SHRUBLANDS have low trees and shrubs, such as hawthorn. A variety of wildflowers and grasses act as ground cover. GRASSLANDS are areas of wildflowers and grasses, such as goldenrod, ragweed, and clovers. Trees and shrubs are scattered or absent. WETLAND communities have marsh or water plants such as cattails, sedges, and lilies.

Some of the animals found in each of the communities are listed on Student Handout 3. Duplicate and distribute a copy of the handout to each student. Read over the list with your students and ask them which type of community they live in. Have they visited other types of communities? If so, where? What animals did they see that can be added to this list? See if students can cite examples of the four types of natural communities around the state or country.

Remind students to save this handout. They will refer to it when they study more about habitats and food chains.

Explain to students that a good way to learn more about our neighborhoods and our needs is to study nature. Animals also live in houses, just like people do. Animal houses are just one part of their habitat. A habitat is a special place that provides the animal with what it needs to live, a lot like our neighborhoods.

Some animals live in habitats that are cool, dark, and wet. Earthworms need this kind of habitat. So do snails, and the centipedes in your basement! Many lizards are found in habitats that are hot and dry. All fish live in a water environment, but different fish require different water habitats. Trout habitats are rushing streams with cold water. Catfish habitats are slow-moving rivers and ponds that are warm and murky.



No matter if it is in the jungle or on top of a mountain, a habitat is just right for the animals that live there. A habitat meets all the organism's basic needs: food, air, water, shelter, and living space.

Group Living

In nature, animal habitats usually overlap in areas where several plants and animals need the same thing. Groups of overlapping habitats are called communities. People are part of communities, too. Neighborhoods of people often overlap the habitats of animals. The people, plants, and animals living together in any community share certain things.

A forest community, for example, may be made up of the overlapping habitats of a squirrel, a woodpecker, insects, and a chipmunk or two. The squirrel and chipmunk share the nuts produced by a tree and the woodpecker and insects share a tree for their homes. Woodland animals may also share paths, bushes that provide cover, and a dead tree for perching, hiding, or singing.

In our urban communities, neighborhoods of people using the same stores, schools, streets, and parks overlap with the habitats of many animals like pigeons, squirrels, mice and mosquitoes that use some of the same buildings and trees that we do.

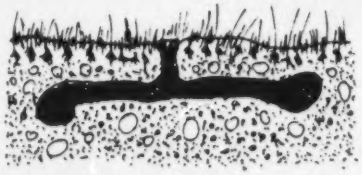
All communities together make up the environment. The environment is everything around us that makes up Planet Earth.

Use Student Handout 4 to help students distinguish between habitats, communities, and the environment by identifying and labeling the pictures.

Animal Architects

People build different types of houses in different communities. The type of house often depends on the climate, materials available, skill of the builder, and other factors in the environment.

Animals in different communities also build different types of houses. Their houses also depend on the climate, available materials, and skill of the builder. Animals have adaptations, special features that improve their chances for surviving and reproducing. Examples of adaptations include claws on a mole for digging burrows or large teeth on a beaver for gnawing wood to build lodges.



Use Student Handout 5 to acquaint your students with different styles of human homes. The supplementary reading gives students information about animal homes. Help students determine the kind of structural adaptations that would be advantageous to an animal in each situation. Be sure to discuss how these adaptations help the animal live in that community. Then have students search their houses and yards for animal homes. A follow-up discussion in class will help them to identify the inhabitants, think about adaptations, and learn which animal and human habitats overlap.

Interdisciplinary Activities

Environmental concepts can be reinforced by presenting them in a variety of subject areas. The following activities will help integrate the concepts of this unit into the various classes and experiences.

Language Arts: After researching a particular animal's habitat, have students pretend they are visiting there on vacation. Using post card-size pieces of paper, encourage them to draw the animal house they are staying in. The message they write should show that they understand what

the animal house is like -- its color, feel, smell, etc. Even the stamp address can be creative expression!

Art: Your class can compile a "House Beautiful" magazine -- of animal homes! Each student can research one animal house and make a full page illustration. Diagrams or side views may be included as well as color "photos." Be sure students identify and write a brief description of the dream homes at the bottom of each page.

Mathematics: Do all animals have the same size homes? After researching or measuring the size of animal homes, students can figure out how much space per animal is needed. For example, forest soils are teeming with life. Studies show that as many as 9,939 animals such as earthworms and mites may be found in one square foot of soil, two inches deep. How many square inches of soil is this? How many animals per square inch? How many per yard? acre? Next find out how many people live in your community. How many live in each square mile?

Social Studies: The concept of communities can be reemphasized by having students locate and color the four types of natural communities on a state map. Use a vegetation map in an atlas to determine community boundaries. Transfer these to an outline of a state map. Duplicate a map for each student. Map reading skills will be reinforced as students refer to an atlas to label and color each community region. Use green to indicate woodlands, yellow for shrublands, orange for grasslands, and blue for wetlands.

3. Food Chains and Webs

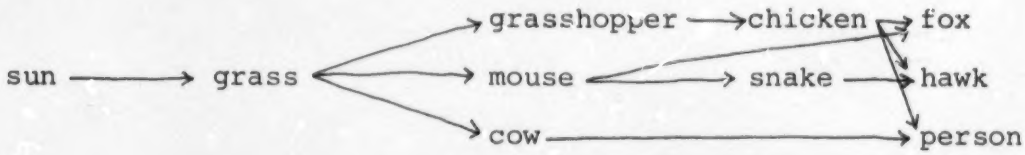
People living in a community depend on each other in many ways. Animals in a community also depend on each other. Perhaps the major way that animals depend on each other is for food. Animals need the energy that is stored in food. The energy originally comes from the sun, is converted into a useable form by plants, and is then available to animals.

A food chain is a diagram of nutritional relationships in a community. It shows which animals depend on which food -- or who eats whom! Humans are part of many of these food chains.

An example of a grassland food chain is shown below.

sun ⟶ grass ⟶ mouse ⟶ snake ⟶ hawk

In nature, things are seldom this simple. Most animals do not have just one source of food as a food chain implies. Rather, animals feed on a variety of things. Many food chains overlap or are interconnected. A diagram of these more realistic, interconnected food chains is called a food web. An example of a food web is shown below.



Student Handout 6 gives students practice at arranging animals from each community into food chains. Students should refer to Handout 3 to decide which animals belong in the same food chain. The food chains students make may vary, which is the right idea! In nature, food chains can be made up of several different combinations of animals, all linked to plants, which depend on the sun.

Vocabulary Words

Have you noticed the words underlined in the text? Those words may be new to you or to your students. Knowing what they mean will enhance your tour of animal homes, so their definitions are provided below.

ADAPTATION -- any special feature of an organism that improves its chances for surviving and reproducing

COMMUNITY -- the area where a set of conditions meets the needs of many animals and plants

ENDANGERED -- a species in immediate danger of extinction

ENVIRONMENT -- everything that surrounds an animal

EXTINCT -- a species that no longer exists

FOOD CHAIN -- a simplified picture representing the nutritional relationships in a community

FOOD WEB -- a picture representing the nutritional relationships in a community that shows interrelated food chains

GRASSLAND -- an area of wildflowers and grasses

HABITAT -- the area that supplies an animal with the food, water, air, shelter, and space it needs to live and reproduce

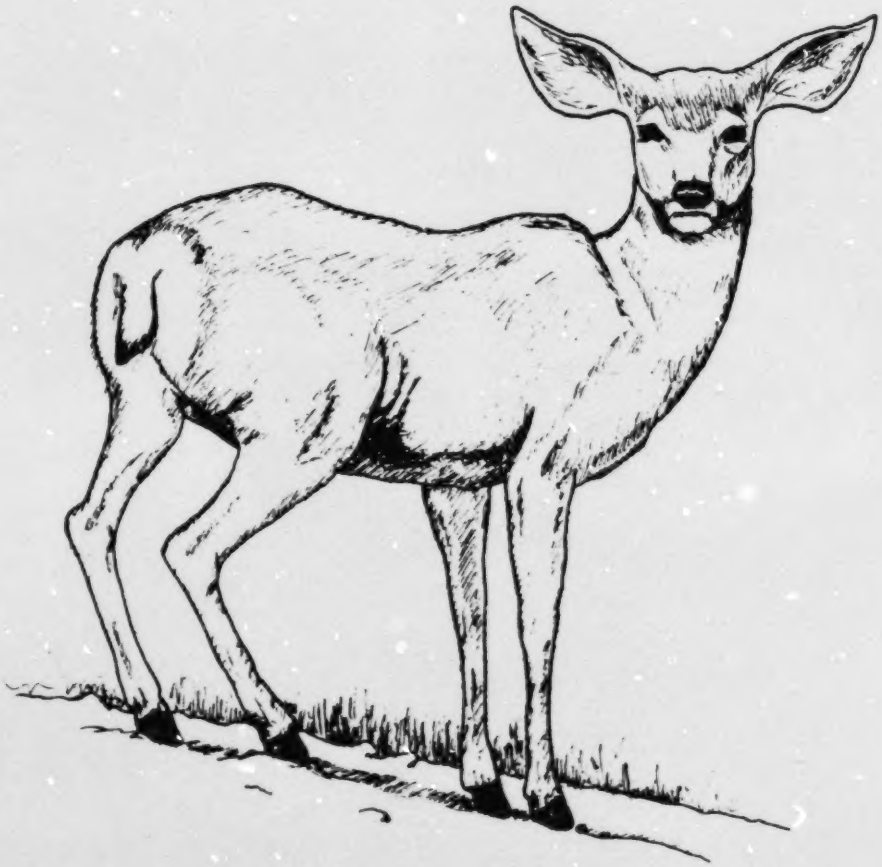
POPULATION -- a group of organisms of the same kind that live and reproduce in a given area

SHRUBLAND -- an area with small trees and shrubs

THREATENED -- a species with declining population that has not yet reached the endangered status

WETLAND -- a wet area with marsh or water plants

WOODLAND -- an area with large trees and some ground plants



Name _____

A Place to Live

Student Handout 1

Part 1: Where Do I Live?

Fill in the blanks below with one or more words to tell where you live.

I live in a _____ house.

I have a _____ yard.

I live in a city called _____.

I live in the state of _____.

The country I live in is _____.

I live on the Planet _____.

Part 2: My Special Neighborhood

Every neighborhood is different. Close your eyes and think about your neighborhood. In the spaces below, tell what makes your neighborhood different and special.

My Neighborhood

_____

(use one word for how it looks)

_____ _____

(use two words for how the place smells)

_____ _____ _____

(use three words for how it sounds)

_____ _____ _____ _____

(use four words for what it feels like)

_____

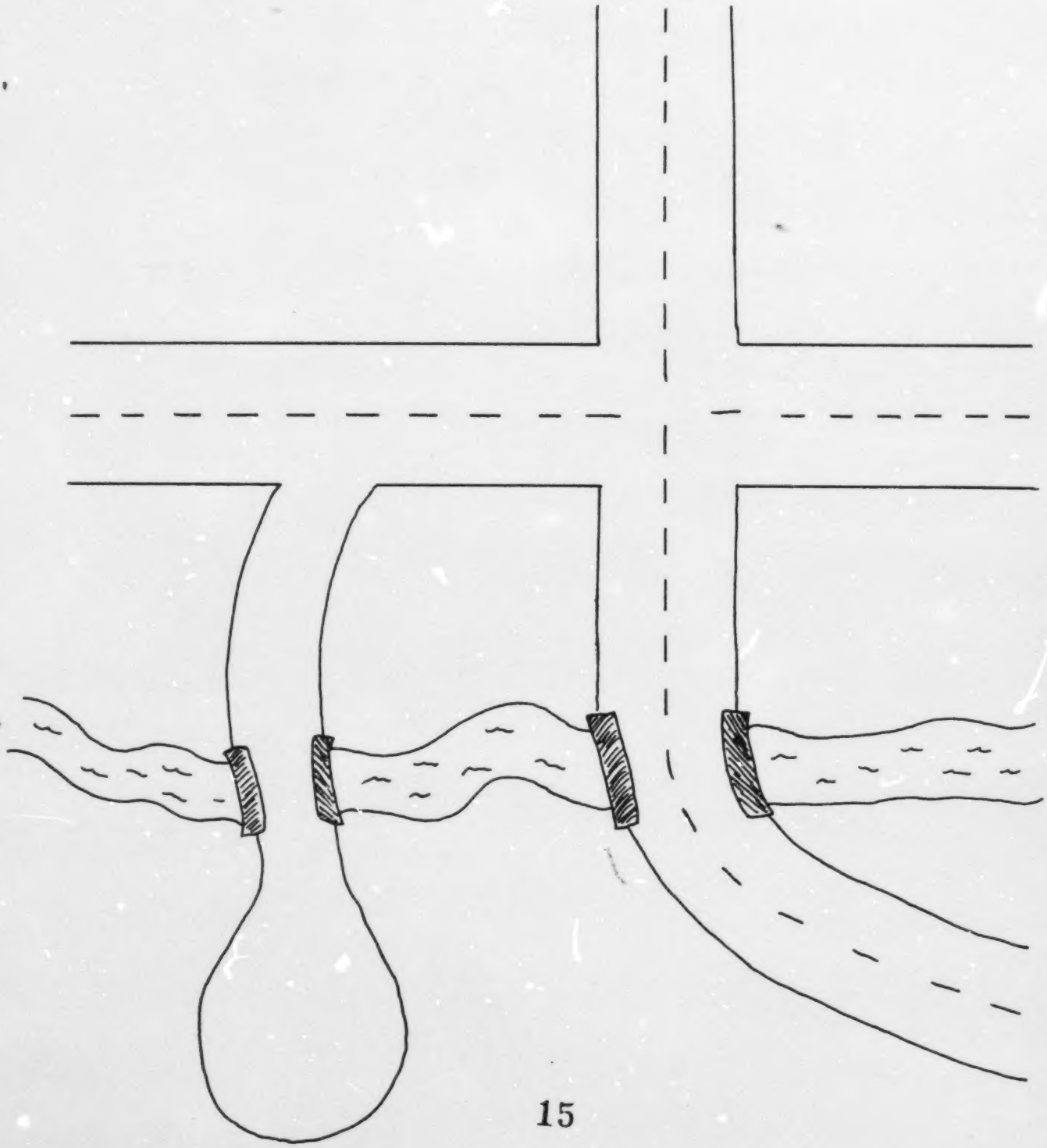
(use one word to tell how you feel when you're in your neighborhood)

Name_____

People Places

Student Handout 2

On the neighborhood map below, draw a house for you and your family. Then, draw all the things that you will need in your neighborhood so that you can live.



Name_____

Michigan Communities

Student Handout 3

Listed below are the four types of Michigan communities and the animals often found in each.*

Woodlands: trees and some ground plants

bear	owl	box turtle
chipmunk	red-eyed vireo	salamander
squirrel	woodpecker	insects
deer mouse	towhee	toads
		ants

Shrublands: small trees and shrubs such as hawthorn; lots of ground plants; many animals from the field and woods feed here

white-tailed deer	tree swallow	insects
cottontail rabbit	fox	groundhog

Grasslands: lots of ground plants and grasses such as goldenrod, ragweed, and clover; few trees and shrubs

meadow vole	killdeer	grasshoppers
groundhog	eastern bluebird	crickets
meadow mouse	horned lark	butterflies
garter snake	bobolink	ring-necked pheasant
meadowlark		

Wetlands: water plants such as cattails, sedges, and lilies

muskrat	ducks
beaver	grebe
water snake	herons
turtles	red-winged blackbird
frogs	osprey
fish	
	crayfish
	dragonfly
	caddis fly
	diving beetle
	damselfly

* *modified from "Habitats and Inhabitants" and printed with permission from Kent Intermediate School District, Grand Rapids, MI.*

Name_____

Group Living

Student Handout 4

Look at each drawing below. Decide if it is a picture of a habitat, community, or the environment. Write the correct word on the line beneath each picture.

1._____

2._____

3._____

4._____

5._____

6._____

Name _____

Animal Architects

Student Handout 5

Part 1: Human Homes

Write the name of the community where you think each house would be built. Use the word woodlands, shrublands, grasslands, or wetlands.

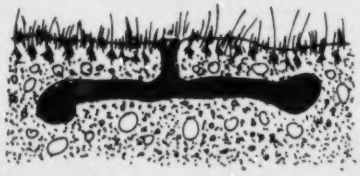
_____ _____ _____

Part 2: Animal Houses

Read the information about each animal and the kind of house it builds. Then circle the adaptations that would help the animal build and live in that kind of house.

1. Marvelous Moles

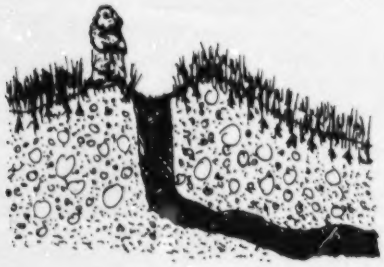
Moles are tiny animals that build long underground tunnels to live in. They dig the tunnels with their front feet. They dig so fast that it looks like they are swimming through the soil! The tunnels are also used to trap food. Moles have sharp teeth so they can eat grubs, worms, and insects. Insects and worms crawling through the soil fall into the tunnels -- and on to the mole's dinner table!



To build and live in houses like these, it would help moles to have (circle one in each pair):

Rounded, chewing teeth	or	Sharp, pointed teeth
Strong front legs	or	Strong back legs
Hooves	or	Short, sharp claws
A slender body and short legs	or	A round, fat body and long legs

2. Perky Prairie Dogs



Prairie dogs live in grasslands. They live in "towns" made up of miles and miles of underground tunnels. One town in Texas was so big that 400 million prairie dogs lived in it. That is twice as many people as live in the U.S.! Prairie dogs sit on the mound of dirt at the front door to their burrows. They watch for signs of danger. When danger is near, one dog whistles and the whole town dives into the safety of the burrows.

Adaptations that help a prairie dog are (circle one in each pair):

Brown fur	or	Bright red fur
Poor eyesight	or	Sharp eyesight
Ability to move fast	or	No ability to move fast
Hooves	or	Sharp claws

3. Brilliant Beavers

Beavers are the famous builders in the wetlands. A beaver house is called a lodge. To make a lodge, the beavers use their teeth to cut down shrubs and small trees in the woods near their pond. They pile the sticks along with mud and stones into a mound in the water. The beavers chew out a room inside the mound. They make two underwater doors. Then the beavers cover the mound with mud. The mud keeps the lodge warm all winter no matter how cold the weather is!

Adaptations helpful to beavers are (circle one in each pair):

Strong, chewing teeth	or	Thin, pointed teeth
Feathers	or	Thick fur
Short, strong legs with claws	or	Long legs with hooves
Webbed feet	or	Not webbed feet

4. Talented Termites

Termites are some of the best builders in the world! In hot, dry climates, they build tall air sacks to keep their homes cool. The houses are built out of sand and mud which they carry in their mouths! They pack the sand and mud so hard that heavy rain runs right off them. The houses are shaped like mounds. Some of the mounds are taller than a person! Inside the mounds are hundreds of holes and rooms for the many, many termites in the colony.

Termites have these helpful adaptations (circle one in each pair):

Strong, chewing mouthparts	or	Fragile, sucking mouthparts
Strong jaws to carry things	or	Weak jaws but long wings
Ability to communicate with other termites	or	No ability to communicate with other termites

Name _____

Food Chains

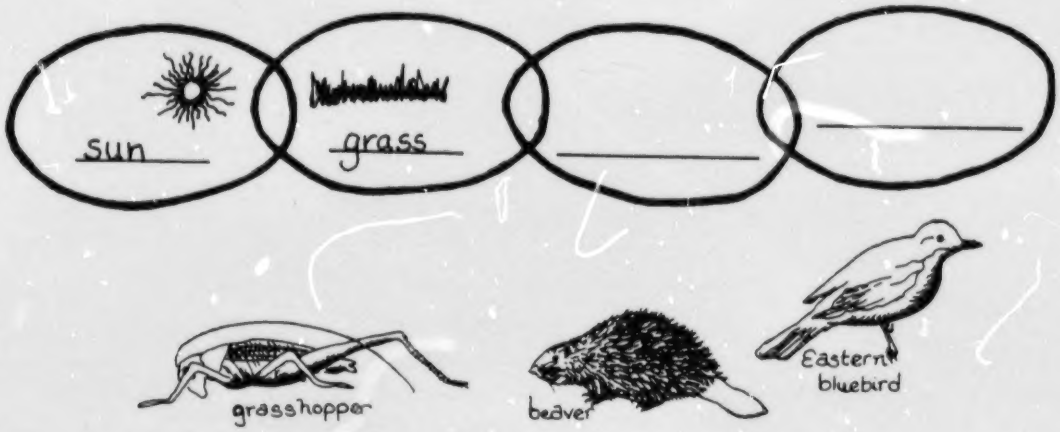
Student Handout 6

Part 1: Food Chains

First make food chains in the examples below by writing a name in each blank. Remember to use animals that live in the same community! Some animals won't be used because they don't live there.

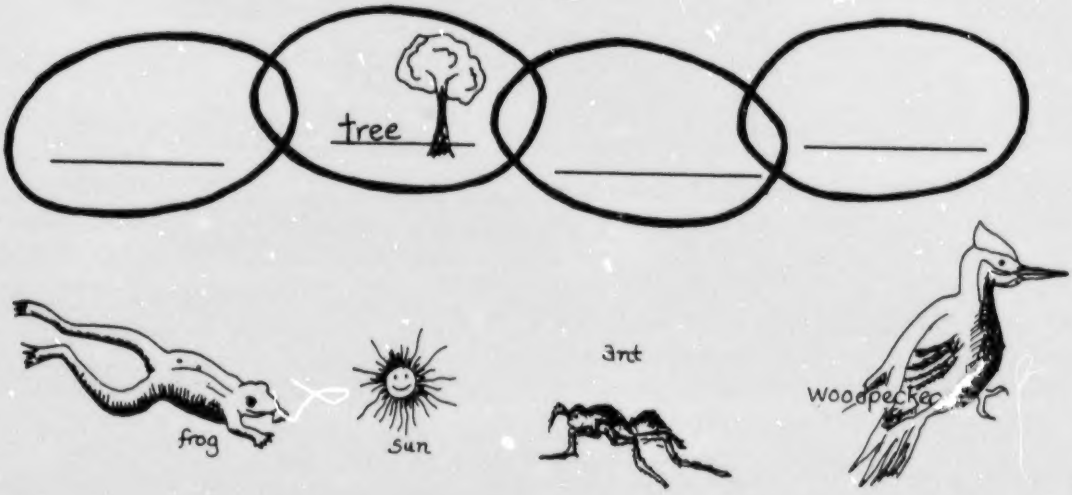
Then write the name of the community in which the food chain would be found: WOODLANDS, SHRUBLANDS, GRASSLANDS, or WETLANDS.

1.



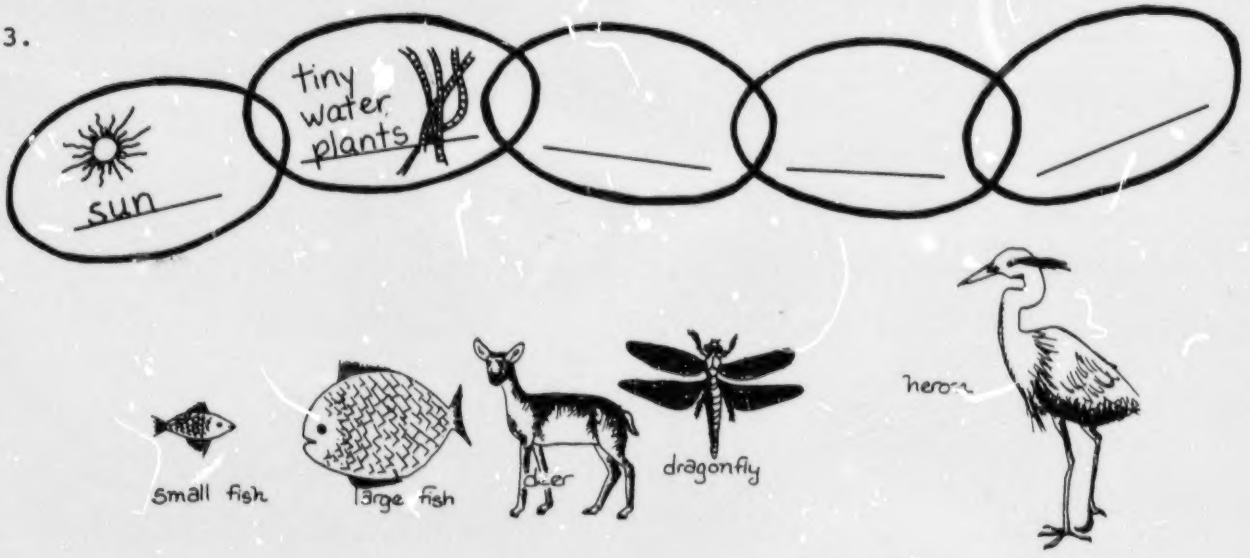
This food chain is from the _____ community.

2.



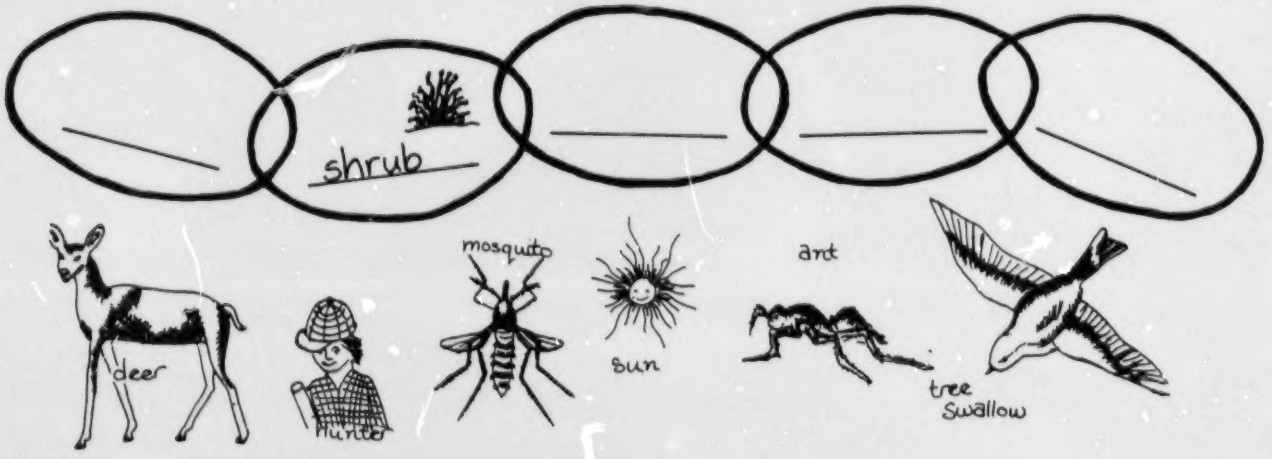
This food chain is from the _____ community.

3.



This food chain is from the _____ community.

4.



This food chain is from the _____ community.

Part 2: What did you eat for breakfast? Think about where your breakfast food came from. Draw a food chain that traces it back to the sun. Be sure to include yourself in the chain!

Dear Parents,

Your son/daughter, (_____), is cordially invited to attend an open house sponsored by several prominent animal residents at the Dahlem Environmental Education Center. S/he is invited on the basis of our on-going participation in a school and field trip study program, "Animal Homes and Habitats."

Proper attire should include sturdy shoes, layered clothing, rain coats and water repellent footwear in the event of rain.

You are encouraged to share the benefits of the tour with your child. Please make every effort to:

- inquire about what s/he experienced on the field trip.
- introduce him/her to animal homes in your neighborhood.
- visit the Dahlem Environmental Education Center so your child can show you around.

Cordially yours,

Third Grade Teacher

Field Trip

Thanks to all the background preparation you've done, your students are now ready for their tour of animal homes at the Dahlem Environmental Education Center. We're looking forward to meeting you and your class and leading you on this exciting tour. The information and concepts you have introduced will be expanded and reinforced on the field trip.

Your field experience will begin with an indoor review of the concepts of habitat and community. Part of this presentation will utilize the Center's live bees in their hive. Students can touch and examine stuffed specimens to discover animal adaptations.

Then you're ready to hit the trails! A guide will lead you through Michigan's four communities: woodlands, shrublands, grasslands, and wetlands. Your students will observe numerous habitats -- and hopefully the inhabitants.

The animals living in the communities will be linked together with the concept of food chains. An outdoor game will carry the concept a step further, relating nutritional relationships to fluctuating animal populations.

The rest is up to you! -- Carrying field trip concepts back to your classroom and relating them to the students' lives will give you hours of discovery, contemplation and enjoyment. We hope the post-trip activities in this packet will help.

Post-Trip Activities

Don't stop yet! Perhaps the most important part of this program lies ahead -- linking the world of nature "out there" to the student's world "back here." These post-trip activities also provide an opportunity for you to undertake two of the biggest challenges of teaching: helping students to identify and think about their values and leading them to develop responsible attitudes toward the environment. This will prepare them to be good decision-makers later on.

1. Making a Mural: A Review

Now that you are back in your room at school, your children should be able to discuss their field trip by describing the four different communities they visited.

It would be fun and easy for the students to create a mural showing woodland, grassland, shrubland, and wetland areas. You might divide the children into four groups, assigning each group a different community. Let each group decide among themselves which plants and animals to include in their section. Give them long, large pieces of paper, pencils, crayons or paint and let them go! When each group has finished, connect the sections and find a nice long wall on which to display your mural. Then sit back and wait for all the compliments!

2. Ups and Downs, Naturally

A population is the total number of individuals of a particular species in an area, whether they are poodles, poppies, or people in Paris, Persia, or Peru! Populations are constantly changing. Animal populations tend to increase rapidly, then level off at the number which the environment can support. There is only so much food, water, air, shelter, and living space to go around!

Wildlife bioligists have identified several natural causes of fluctuation in animal populations. See how many of

the following natural population controls your students can think of:

Getting Eaten -- Predation is probably the most constant pressure on prey populations. In predation, some animals feed on others, thus controlling prey populations. Cannibalism is also common among the young of some species, such as northern pike and preying mantis.

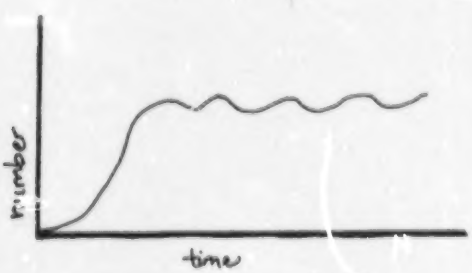
Moving Away -- Migration is movement out of an area of overpopulation or food shortage. Muskrats, for example, often migrate in the spring.

Getting Sick -- Crowding lowers an animal's resistance and increases its susceptibility to disease and parasitism. For example, encephalitis, a disease that causes brain inflammation, has reduced high skunk populations.

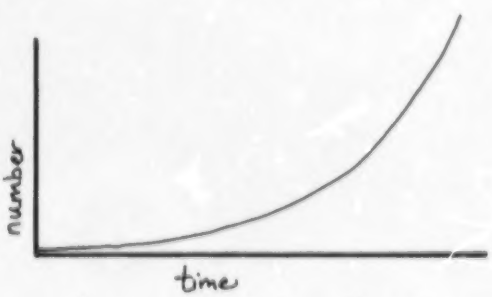
Bad Weather -- Droughts, floods, and severe winters take their toll on animal popultaions.

Starving -- Usually starvation occurs in the winter. A massive reduction in deer populations often results when severe winters keep too many deer in overbrowsed areas for too long.

Crowding -- Overcrowding can cause density stress in animals. Hormone imbalances that sometimes result can cause abortion, shock disease, increased fighting, and increased mortality. Biologists have studied this in deer, rat, and lemming populations.



Animal Population Growth



Human Population Growth

A graph of human population growth looks like the first part of an animal population graph. The human population on Planet Earth has sharply and consistently increased since the Industrial Revolution. Although we are subject to the same natural controls as animal populations, increases in technology and medicine have enabled our population to consistently increase instead of leveling off. Scientists do not agree on what the human population capacity is for Planet Earth.

A Population Play to Complete

The following skit will help make the components of population change more clear to your students. They might wish to act out the play as you read this introduction, then form small groups to create the remainder. Natural population controls such as severe weather, disease, overcrowding, migration, and of course population growth should be included.

Many of your students may become rabbits during the course of the skit; you will also begin with a fox and yourself as a narrator.

A Rabbit Story - or - "Hare Today Gone Tomorrow"

Once upon a time there were 3 rabbits. They wiggled their noses, sniffed the air, and perked up their ears to listen for danger. The rabbits lived at the edge of a big woods and they hopped from place to place eating clover and sumac bark. Because the rabbits had plenty of food and a good habitat, they grew and were healthy. Before long they had 5 baby rabbits to share their habitat with. One day while the rabbits were hopping through a meadow one of the younger rabbits wandered off by himself. Before long, out of the woods came a sly hungry fox. The fox was a mother with babies of her own to feed. She snatched the little rabbit and took him back to her den to feed her pups. On the other side of the meadow, the rabbit family.....

Now you and your class can finish this story. Have fun!!

Population Dynamics

Student Handout 7 will give students practice in problem-solving and basic math skills while reinforcing concepts in population dynamics and food chains. Go over the answers carefully with your students. The concepts are more important than the actual calculations. If students are adept at math, try making the stories more realistic by including the effects of predators, road kills, and migrations on the population statistics.

Endangered Species

Most scientists believe that extinction can be a natural occurence. When the environment changes so much that an animal species has difficulty living there, the species may be endangered. Animals listed as endangered species are in immediate danger of becoming extinct. Animals are classified as threatened when their population is declining but before it reaches the endangered level.

Clearly, extinction is no longer a result of only natural processes. Most extinction today is the result of exploitation or habitat destruction by humans. Extinction can be the direct result of human settlement as well as an indirect result of pollution and the introduction of alien species into natural communities.

Library Search

Encourage groups of three students to choose an endangered animal and research it in the library. They should try to find pictures and habitat descriptions for the animal. See if they can find out where the animal lives. It may be possible for them to discover why the animal is endangered.

Here are some suggestions of endangered species which they might choose from:

Whooping Crane
Green Sea Turtle
American Crocodile
California Condor
Humpback Whale
Orangutan
Snow Leopard
Cheetah
Galapagos Penguin
Bald Eagle
Wild Yak
Gray Wolf
Tiger
Ocelot
Jaguar
Gorilla

If you and your class would like to know more about endangered species check the resource section of this packet.

3. The Human Factor

Some of the environmental changes that people have introduced are very damaging to wildlife populations. Most people point to pollution, forest fires, and farming practices that increase soil erosion as the greatest offenders of wildlife populations. These and other forms of habitat destruction are the greatest strain on wildlife. This is mainly a result of increasing urbanization.

A common example is littering, especially in urban areas. Piles of trash accumulate and attract disease-carrying vermin to the area. Dumping pets or letting them go wild affects wildlife populations. Especially in rural areas, cats and packs of dogs kill deer and native birds as well as domestic cattle and sheep. Pets do not simply return to the wild.

Birdfeeders also affect wildlife populations. Although it has been shown that birdfeeders do increase the population of certain species of birds, they change the species of birds naturally found in the area. Aggressive birds are attracted and often frighten more docile species away. Because birds congregate around the feeder, a Cooper's hawk or similar predator happening by can grab an easy meal!

It is unlikely that the use of birdfeeders by your students will radically alter bird populations. The important thing for them to realize is that any activity involving animals is a commitment. If they begin feeding the birds, they must take the responsibility of doing so <u>all winter</u>. Birds easily become dependent on the feeders and could starve if feeding is interrupted.

<u>Wildlife Management</u>

When human and wildlife populations overlap, a conflict between human culture and the natural environment results. Of course, all of the interactions are not bad. Wildlife management is a program aimed at altering or maintaining the environment to favor the needs of certain wild animals. In the past, wildlife management has emphasized manipulating animal populations by predator control, artificial stocking, and establishing refuges. Today, wildlife management emphasizes habitat manipulation based on scientific research.

Student Handout 8 contains one story of habitat management. It describes the Kirtland warbler, and endangered species in Michigan. Students may find this story fascinating to read and a good vocabulary review.

The Question of Hunting

Another means of managing wildlife populations is hunting. Hunting, however, is a very emotional issue about which people have very different opinions. Your responsibility as a teacher, to view and present all angles of the problem, is great. (Presenting several viewpoints in a nonjudgmental manner is a real challenge!)

Some of your students may have already hunted frogs or birds, others probably know hunters. Have your students thought about both sides of the hunting issue? Whether or not they have opinions about hunting, they probably do not know many facts.

The following activity will help your students understand different perspectives surrounding the hunting question. To strengthen the material here, you may wish to invite speakers from opposing sides to speak to your class. Check the reference section for organizations that will provide speakers or materials.

A Range of Opinions

If students are to be wise decision-makers, they must be able to see more than one side of an issue. The values continuum on Student Handout 9 is in relation to the opinions of others.

Divide the class into groups of three or four students. Explain that a values continuum is a scale that shows the variety of ideas people hold on an issue. The two ends of the

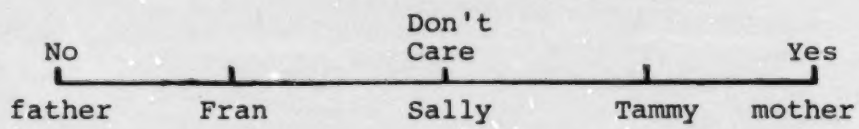
continuum represent extreme positions. The middle position is completely neutral. Few people genuinely hold any of these three positions.

The slash marks along the continuum indicate moderate positions at which people can agree with some arguments from each side of the issue, but clearly prefer one of the sides.

A practical example may help students grasp the abstract concept of a continuum. Draw a continuum line on the blackboard. Tell students you will read them a story and you want them to arrange the opinions expressed by the people in the continuum.

> Story: Joe wanted to watch TV, but he knew he should ask his parents and three sisters to see if it were okay. His father said no. His mother said yes. His older sister, Fran, said no, unless they watched a nature show on channel 5. His second sister, Tammy, said he could watch channels 1, 3, and 5 but not 7. His younger sister, Sally, was going to take a nap so she didn't care.

The continuum should look something like this:



Now your students are ready to look at the range of opinions regarding hunting. Pass out Student Handout 9. Have groups of three students read and arrange the nine opinions along the continuum near the bottom of the page. Check student answers. Although answers may vary, opinions one and three should be placed at the extremes and opinions five and eight near the center.

Next distribute Student Handout 10, the Hunting Information Sheet. The Teacher Copy is for your reference. Have each group read and discuss where each statement belongs on the continuum on Student Handout 9. Finally, ask each student to place a mark along the continuum to show where s/he stands on the hunting issue. The two facts from the information sheet that helped the student decide on his/her opinion should be recorded on the back of Handout 9.

Encourage students to share their views with the class. Stress that their stance should be supported by facts from the information sheet or class presentations. *Above all, stress that there are no absolutely right or wrong opinions. Students should listen to and not criticize the opinions of others -- as long as they are supported.* Finally, remind students that, as they hear more facts about an issue, their opinions may change. It is important to be open to change when more information is available.

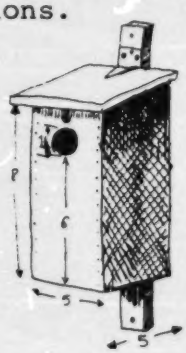
4. Taking Action

The activities and field trip in this program have provided your students with a range of information about animal habitats and how people affect them. Now it's time to put these ideas into practice! Involvement in a social issue cements the concepts into the student's mind and may produce positive changes in behavior and attitudes.

Here: Habitat Helpers

There are several ways students can have a positive effect on wildlife habitats in their own community.

Bluebird Houses -- The bluebird population has declined due to the loss of nesting sites. Students can help the bluebird and other cavity nesting birds by building nest boxes and placing them in suitable habitats. Check the diagram for dimensions.



Bird Feeders -- When properly used, bird feeders (anything from a suet bag to a manufactured model) can help wildlife. Students can install feeders and observe birds that use the feeders. Better still, have students research bird diets and plant shrubs that will provide natural food and cover.

Erosion Control -- Be it a bald strip of ground beside the house or a fallow field, erosion is happening there! Students can help reduce erosion and provide cover for wildlife by planting areas with selected plants.

Elsewhere: Wildlife Activities

An endangered animal is part of the student's environment no matter if it is a Kirtland warbler in Michigan or an orangu-

tan in Indonesia. To help focus student attention on endangered species and to increase their global awareness, try some of these activities. The information students gathered earlier on endangered species will come in handy!

Silk Screen T-Shirts -- Come on, now, it's not that hard! If students design a simple logo about endangered species, you can transfer the pattern to a screen following the simple directions in the silk screening kit. The process is fun for students -- and good publicity for endangered species.

Posters -- Your students' design and art skills will be sharpened when they make posters featuring the endangered animal they researched. Add an exercise in language skills as well by instructing them to find a phrase or slogan to enhance the poster. A display on a prominent school bulletin board will remind all students about endangered species.

Write On! -- Divide the students into groups to compose and write letters for free information on endangered species. Check the reference section for a listing of addresses.

Recycle -- Have the class collect recyclable materials (paper, glass, cans, plastic) to sell. Put the money in a fund throughout the school term. Have students suggest ways to disperse the funds that will help wildlife, then vote on a preferred plan. Some suggestions are to make a donation to a wildlife fund, subscribe to a wildlife magazine, or rent a wildlife film to show at a school assembly.

Adopt! -- Many zoos are looking for wildlife sponsors. Using money from a sale or donation, your class can adopt an animal for the year. The new relationship may generate a visit to the zoo and a study of the animal's natural history. Prices vary from about $2.00 per year to adopt an African Chicklet (fish) to $2000.00 for an elephant.

Wow! Your tour is finished! You've led your students through animal homes and habitats in four types of communities, and you've waded through principles of population change and the impacts of humankind on wildlife. These concepts and skills have begun to prepare students for their journey through the rest of their lives as wise decision-makers. So lean back in your seat and prop up your feet -- you deserve a break!

Name _____

DYNAMITE! Exploding Populations

Student Handout 7

Animal populations are always changing! Figure out the stories below to see the changes.

Bobcats and Mice

1. Bobcats and mice live in and around a forest clearing. The bobcats eat mice. After a month there are still the same number of mice. Why? _____

2. The bobcats have kittens. What do you think will happen to the mouse population now? _____

3. Mice eat grass seeds. Will the lower mouse population change the number of seeds eaten? _____

4. How will the number of seeds eaten change the forest clearing?
_____

5. Does a bobcat change the grass population? How? _____
_____

6. On the blanks below, fill in the food chain described above.

sun --- _____ --- mouse --- _____

Deer and More Deer

Under good conditions, one pair of adult deer will have two fawns each year. Suppose the fawns born are half males and half females. Starting with one buck and one doe, how would the deer population increase? Find out by filling in the chart below.

year	bucks	does	fawns born	total deer pop.
0	1	1	---	2
1	1	1	2	
2	2			
3		4	8	
4	8			
5		16	32	

Name _____

A Success Story (So Far...)

Student Handout 8

You'd be the envy of every birdwatcher if you looked out your window and saw a bluish-grey and yellow bird fly by. That is, if it were a Kirtland warbler.

The Kirtland warbler is an endangered species. Although it migrates to the Bahamas in the winter, it spends the rest of the time in a small area of Michigan. That is the only place it is found in the spring, summer, and fall!

Why is this bird endangered? Scientists think there are two main reasons. One is that it needs a very special habitat. The warblers only nest in groves of young jack pine trees. The trees must be between eight and fifteen feet tall and have bushy lower branches. For many years, people have been trying to prevent forest fires. Without burning, the jack pine trees have grown tall and old. Because they were no longer good habitat for Kirtland warblers, the warbler population dropped.

Another reason the warblers are endangered is because of cowbirds. Cowbirds lay their eggs in another bird's nest and allow the other parent to hatch and feed the young cowbird. Because the cowbird hatches first and grows faster, it pushes the rest of the baby birds out of the nest. Scientists found that over half of the Kirtland warbler nests have cowbirds in them!

Does the Kirtland warbler story have a happy ending? It does for now. The U.S. Forest Service has begun to manage several thousand acres for the warbler. They allow the trees to burn once in a while to provide good warbler habitat. They also trap and remove cowbirds every year.

It is too early to tell if the Kirtland warbler will become extinct or not. But for now, people are doing their best to keep this species from disappearing forever.

Below are some definitions of words which were underlined in the story above. Write each correct word on the line.

1. A kind of plant or animal, such as a dinosaur, that no longer lives anywhere on the earth is said to be _____.

2. When a kind of plant or animal, such as the Kirtland warbler, may become extinct it is said to be _____.

3. An area which supplies an animal with all of the food, water, air, shelter and space it needs to live and reproduce is called a _____.

4. A group of similar plants or animals that live and reproduce in a certain area is called a _____.

5. When an animal moves its home from one place to another usually with the changing seasons, it's called _____.

Name _____

Hunting: How Do You Feel?

Student Handout 9

Read what each person says and decide where he or she belongs on the line at the bottom of the page.*

Hunting is good for people and wildlife. More people should hunt.
Hunters have heart attacks, shoot other hunters and shoot up the woods.
The number of hunting licenses sold should be cut way down. Too many animals are being killed.
Hunting is bad! It kills helpless animals! Hunting should not be allowed.
It's okay to hunt if you need the meat. People who just like to shoot things shouldn't be allowed to hunt.
Nature will control animal populations. We don't need hunters.
It's good for people to hunt because they can enjoy the outdoors. Besides, it's no worse than football!
I don't care if people hunt, as long as they don't walk through my yard!
Someone should feed animals in the winter so hunters can have more to shoot at.

don't like hunting don't care like hunting

How do you feel? Place a check mark on the line to show how you feel about hunting. On the back of this paper, write two facts that helped you decide why you felt that way.

* *modified from "Deer and People" and printed with permission from Kent Intermediate School District, Grand Rapids, MI.*

Name_____

Hunting Information Sheet

Student Handout 10

Listed below are statements about hunting. Read them and think about them. They will help you decide what you think about hunting.

1. Money from hunters is used to help wildlife.

2. Hunters only shoot the best animals, leaving smaller animals to breed.

3. All animals shot by hunters are not killed. Some get away and die slowly or are crippled for life.

4. Hunting as a sport does not reduce animal populations.

5. Some hunters shoot animals that they aren't supposed to shoot at, like farm animals and endangered species.

6. When most hunters kill an animal, they don't use the whole thing. Much of it is wasted.

7. Some hunters need the meat to feed their families.

8. Hunting helps keep disease from spreading among animals.

9. Some hunters do not take care of the woods while they are there. Some trespass on private property.

10. Some hunters understand animals and love nature.

TEACHER'S COPY
Hunting Information Sheet

Listed below are statements about hunting from several sources. As you think about them, remember that there are several kinds of hunting. Sport hunting is for recreation. It is controlled by laws and usually requires a license. Market hunting is for profit. Although land animals are not market hunted in the U.S. anymore, many aquatic animals (whales, tuna, salmon, seals) still are. Subsistence hunting is for food. Some people in remote areas depend on animals they capture for food.

1. Hunters have been almost solely responsible for funding the endangered species program.
2. Under established limits and seasons, hunters take only the part of the annual surplus of game that would die over the winter by natural causes anyway.
3. Some hunters trespass on private property while hunting.
4. There are 914 species of mammals in North America. Sixteen of them are hunted in Canada and 35 in the U.S. There are 796 species of birds in North America. Seventy-four are hunted. There are 101 species on the endangered species list, none of which can legally be hunted.
5. The purpose of game management is to produce a shootable surplus for hunters.
6. Hunters not in good physical condition risk heart attacks during rigorous hunts.
7. Scientific management with rigidly controlled sport hunting has benefited game populations in this country. Examples are the deer, beaver, elk, and wild turkey.
8. Hunters tend to remove the best (i.e., largest and strongest) animals from the breeding population, which means the population gradually becomes smaller and weaker.
9. For every bird or mammal killed quickly by a hunter's bullet, many more are wounded or escape to die a slow death or are crippled for life.
10. People have primarily been hunters through most of history.
11. Research has shown that hunting has no real effect on the population fluctuations of short-lived species such as pheasant and grouse.
12. Some hunters mistakenly shoot protected birds and other species that are illegal to hunt.
13. The non-hunting taxpayer who enjoys bird watching or other non-consumptive uses of wildlife gets essentially a free ride because taxes and fees on hunters pays for most conservation efforts.
14. Hunting reduces personal injury and property damage resulting from wildlife being struck by automobiles.
15. Few hunters utilize the entire carcass of the animal they kill.
16. Some hunters need the meat to feed their families.
17. Hunting reduces the incidence of wildlife diseases, such as rabies and distemper, which may be transmitted to humans, pets, and livestock.
18. Hunters make a significant impact on local and national economies through money spent on guns, ammunition, clothing, transportation, etc. This amounts to more than $2 million per year.
19. Because of hunting, a large number of firearms are easily accessible which can accidently or intentionally be involved in crimes.
20. Some hunters learn to understand animals very well, which brings them closer to nature.

Answer Sheet

Student Handout 1

Answers will vary.

Student Handout 2

Answers will vary.

Student Handout 4

1. habitat	2. environment	3. community
4. community	5. habitat	6. community

Student Handout 5

Part 1: wetlands, woodlands, grasslands

Part 2: MOLES -- circle: sharp, pointed teeth; strong front legs; short, sharp claws; a slender body and short legs.
PRAIRIE DOGS -- circle: brown fur; sharp eyesight; ability to run fast; sharp claws.
BEAVERS -- circle: strong, chewing teeth; thick fur; short strong legs with claws; webbed feet.
TERMITES -- circle: strong, chewing mouthparts; strong jaws to carry things; ability to communicate with other termites.

Student Handout 6

Part 1: 1 -- GRASSLAND COMMUNITY
food chain: sun--grass--grasshopper--eastern bluebird.
2 -- WOODLAND COMMUNITY
food chain: sun--tree--ant--woodpecker.
3 -- WETLAND COMMUNITY
food chain: sun--algae--little fish--big fish--heron.
4 -- SHRUBLAND COMMUNITY
food chain: sun--shrub--deer--hunter--mosquito.
sun--shrub--deer--mosquito
--tree swallow.

Part 3: EXAMPLES OF BREAKFAST FOOD CHAINS:
sun--corn--chicken--eggs--person
sun--corn--cornflakes--person
sun--grass--cow--milk--person
sun--plants--pig--bacon--person

Student Handout 7

BOBCATS AND MICE

1. The number of mice being born and moving into the area must equal the death rate.
2. The mouse population will decrease.
3. Fewer seeds will be eaten.
4. More seeds will grow, so the clearing will become overgrown.
5. Bobcats indirectly control the grass population.
6. sun--grass--mice--bobcat

DEER AND MORE DEER

year	no. of bucks	no. of does	fawns born	total deer pop.
0	1	1	--	2
1	1	1	2	4
2	2	2	4	8
3	4	4	8	16
4	8	8	16	32
5	16	16	32	64

Student Handout 8

1. extinct
2. endangered
3. habitat
4. population
5. migrates

Student Handout 9

Opinions 1 and 3 belong at the extremes. Opinions 5 and 8 should be near the midpoint of the line. Anti-hunting ideas are numbers 2, 4, and 6. Pro-hunting views include numbers 7 and 9.

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J591.166 M *McClug, Robert M. The Amazing Egg. New York: E.P. Dutton, 1980.

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* These books are available at the Jackson District Library. Similar titles may be found at the Jackson District Library's 16 branches under the same Dewey Decimal number.

Books For Teachers...

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At REMC...

The Jackson County Intermediate School District's Regional Educational Media Center has these audio-visual aids:

Motion Pictures

• "Animals at Home in the Desert"	MP 39
• "Animals in the City"	MP 2602
• "Bird Homes"	MP 606
• "Common Animals of the Woods"	MP 655
• "Kirtland's Warbler"	MP 893
• "Our Animal Neighbors"	MP 1914
• "Predators and Prey"	MP 1284
• "Say Goodbye"	MP 1370
• "Termites -- Architects of the Underground"	MP 2043
• "What do They Eat"	MP 2724
• "Wild Animals Adapt"	MP 1732
• "Wild Animals Catch Fish"	MP 1733

Filmstrip/Cassette Sets

• Animal Life Stories	
"Prairie Dog Town"	KTO 540
"Wolves"	KTO 573
"Polar Bears and Seals"	KTO 538
• "Animals that Live in Shells"	SE 1849.1
• Life Cycle Series	
"White Foot, The Story of a Wood Mouse"	SE 826
"Stripe, The Story of a Chipmunk"	SE 824

Transparencies and Ditto Masters

• "Animals"	SE 3084

Magazines

- Ranger Rick
- National Geographic World

And Elsewhere...

You and your students may want to contact the following organizations for more information about wildlife and the environment. Ask them about local chapters in your area.

Government Agencies/Offices:

- U.S. Fish and Wildlife Service
  Department of the Interior
  Washington, D.C. 20240

- Government Printing Office
  Washington, D.C. 29401

- State Department of Natural Resources, Wildlife Division
  Box 30028
  Lansing, MI 48909

Private Organizations

- Friends of Animals, Inc.
  11 W. 60th Street
  New York, NY 10023

- Izaak Walton League of America
  1800 North Kent Street, Suite 806
  Arlington, VA 22209

- Michigan United Conservation Clubs
  P.O. Box 30235
  Lansing, MI 48909

- National Audubon Society
  950 Third Avenue
  New York, NY 10022

- National Rifle Association of America
  1600 Rhode Island Avenue, N.W.
  Washington, D.C. 20036

- National Wildlife Federation
  1412 16th Street, N.W.
  Washington, D.C. 20036

- Sierra Club
  1050 Mills Tower
  San Francisco, CA 94104

- The Fund for Animals
  1765 P. Street, N.W.
  Washington, D.C. 20036

•World Wildlife Fund
Suite 619, 910 17th Street, N.W.
Washington, D.C. 20006

ANIMAL HOMES AND HABITATS

Third Grade Fall Trip

Formal Objectives

Discriminate between habitats and communities in the natural environment by comparing the characteristics and giving examples of each.

Discriminate among the four major types of natural communities in Michigan by viewing and comparing them.

Classify animals according to their community.

Understand how animal populations change by participating in a carrying capacity game.

Appreciate the importance of structural adaptations to animals' survival by identifying and discussing them.

Demonstrate an understanding of food webs by comparing them to food chains.

Informal Objectives

Notice the difference between types of natural communities.

See animals and/or homes in the wild.

Figure out structural adaptations on stuffed specimens.

Play a carrying capacity game.

Play a food web game.

Enjoy the outdoors.

Indoor

Welcome the group. Introduce yourself and the Dahlem Center. Then find out how much they know about animal homes.

Preview the field trip for the group. Using the large map of DEEC, point out the four basic types of Michigan communities -- woodlands, grasslands, shrublands, and wetlands. Point out the location of each and show how the hike will incorporate them all.

Introduce the study skins of the mammals under the Touch Table, making sure that the students can identify the animals. Ask them which community these animals live in, then discuss the structural adaptations the animals exhibit that allow them to survive. A HABITAT is the place that provides an animal with what it needs to live: food, air, water, shelter, and space. A home is a part of a habitat. In nature, animal habitats usually overlap in areas where several plants and animals need the same

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things. These are COMMUNITIES. A forest community is a variety of animals and plants whose habitats all include large trees.

Bridge over to the students' habitat and community, too. Their habitat would include their house, a store, and maybe the friends on their block. Their community would be all the stores, school, people, plants, and animals (dogs, cats, pigeons, . . .) that live in the area. Students who have had pre-trip activities will know this.

Continue to use the Touch Table and the skins to explain adaptations, and let the students predict either the adaptation from a habitat clue (i.e., underground -- sharp claws) or the habitat from the observations of adaptations.

Animals and plants in a community are linked together in FOOD CHAINS. Review this concept using the mounted painting of a grasslands food chain to show dependence, energy flow, and population change.

Outdoors

On the hike, stress animal homes and habitats in each community. Possible finds include:

ant hills	bird nests	galls
mole tunnels	leaf minors	cocoons
ground hog holes	chipmunk holes	deer trails
squirrel nests	woodpecker holes	deer bedding

Food Chain Game -

Use the laminated cards to demonstrate how energy and nutrients move through a food chain. A corner of each card is similarly marked to indicate a set. Pass out the card of one set to a group of demonstration students, and with the entire class, put the kids in proper food chain order. The back of each card lists potential prey for each predator.

Then distribute the cards at random to the class, asking them to get with their group, and form themselves in a food chain. Review the chains and try again. Quit before they are tired.

Bluebird Boxes -

Over 50 nest boxes are scattered across our property, providing homes for the birds to, hopefully, increase their population. Bluebirds need open space to hunt for ground insects and since they are cavity nesters, a hole in a tree to nest in. The bluebird population decline by 90% in the last few decades is due to several factors: 1) larger farms and fewer fence rows, 2) more insecticides, 3) fewer standing, dead trees, and 4) competition from house sparrows and starlings, two aggressive, non-native cavity-nesting species.

Bluebird boxes are placed in areas far from house sparrow habitats, and have an entrance hole too small for starlings. Tree swallows also find bluebird boxes fine homes, but they

are okay.

Our bluebird project is one example of people affecting wildlife (wildlife management). When students return to school they may go through several activities that further develop this concept.

Predator Game -

Materials:

Food blocks, or cards representing coyote's prey, should be blank or marked D, R, S, M, or X.

Blank card means prey escaped.
M = mouse = 1 point
S = squirrel = 3 points
R = rabbit = 4 points
D = deer = 10 points
X = instant death (predation, poison, accident, etc.)

Blindfolds

Procedure:

Spread cards over the hunting area lettered side down. Have all potential coyotes gather around you and explain the following rules.

1. You are all coyotes, and this is your hunting area. The cards represent food that coyotes eat. You are to collect as much food as possible. But just as a coyote couldn't hunt more than one thing at a time, you can only pick up one card at a time and return it to your den, before capturing more.

2. When hunting, you must take the first food card you touch. Under some of the cards are letters. When you return to the den you can look at the letter before returning to hunt. If the coyotes card is blank, that means you missed your prey. Coyotes are not always successful hunters. Go out and try again. An X means instant death. You have been killed by a hunter, died from disease or fatally fell from a cliff. You must stop hunting.

3. Not all of you are healthy coyotes, however. Assign one to be blind and give the student a blindfold. Assign one to be injured - she/he will walk on 3 legs. Assign a third student to be a mother with pups. All of them must stalk your prey on all fours.

4. Now find a den site in the area surrounding the food and prepare for the hunt. Remember no pushing or fighting over food. Coyotes are solitary creatures. They also do not steal food from other coyotes. Everybody ready? Go. (Must constantly remind them to stay on all fours.)

5. When all food cards are captured the round is over. Have them bring their food to the circle. (Leave the den cards if you intend to play the game again.)

6. Now you must find out how much food you captured. First I must tell you that coyotes need a certain amount of food each week to survive. If they can't get enough food, they will get weak and eventually die. The amount of food needed by a coyote varies, though it usually falls somewhere between 15 - 25 pounds. For this game, let's say you need 10 points to survive and stay healthy. To see how well you did, add up the number of points on your cards. M is a mouse, worth 1 point. S stands for squirrel and is worth 2 points. R equals rabbit and gives you 4 points. D means deer and gives you 10 points. How did you do?

Proceed through the totals each child collected. Have each survivor stand up and step outside the circle. Solemnly give those without enough food a death card (a black X or something).

Discussion:

What happened to the blind and injured coyotes? (What happens to injured people? Wild animals don't have doctors, do they?)

What happened to mamma coyote? Did she get 10 points? Explain that pups in this game need 3 points a piece. Did any pups survive? Ask who would go without food, mom or pups? If mom gives all her food to the pups, what hapens to her? If she dies, what happens to the pups next week? What would happen if the pups ate first in all the litters? So who eats first? (Mom) Obviously, mother coyote cannot give up her portion or the whole family dies, so some pups die when food is scarce.

It's too bad some of you had to die, BUT, what would happen if all coyotes lived and had pups and the pups lived and had pups and . . . ? What would happen to the coyote's food supply? (Point out that too many coyotes mean all the coyotes will get some food but none of the coyotes get enough. Then you end up with even fewer coyotes that the habitat could originally hold.)

This piece of land can only support so many of you. The number of animals an area can support and maintain is called its carrying capacity. Habitat is like a bucket, a bucket can hold only so much water and any piece of land can only hold so many coyotes. It is true for any and every animal and every habitat. It's true for humans too! The earth can only support so many people. Every time people change an area, we change its carrying capacity, too, for us and all other animals.

What would happen to the deer, rabbits, and squirrels if we killed off all the coyotes and other predators? (Discuss the adaptations prey animals have to offset predation -- high fecundity.) If these animal populations increase, what happens to the plants in the habitat? Then what happens to the animals? Predators are important then, aren't they? Why?

To The Leader:

This activity should be played more than once, under different conditions to show the kids how changes affect the animals. The number of points you use can be varied as well, to illustrate different circumstances. Putting out cards whose total points equals about one half the number needed for all to survive will result in a very low rate of survival. Having the kids then pair up so that 2 kids equal one coyote (they can hunt one at a time) will produce a large improvement in the survival rate. This is an effective way to illustrate carrying capacity.

If there is only enough time for one round, tell the coyotes what the letters and numbers mean before they start and instruct them to stop at ten. Discuss the results.